August 11, 2005

Federal Communications Commission
445 12th Street, S.W.
Washington, DC 20554

Re: Wireless Operations in the3650-3700 MHZ Band (ET Docket No. 04-151)
Reply to Petitions for Reconsideration

Three of the Petitions for Reconsideration submitted to the FCC asked the agency to at least partially reverse its decision in March that would make the 3650-3700 MHz band readily available to non-exclusive licensees in locales throughout the United States that are not within the Order's fixed satellite service earth station protection zones.

Motorola suggested making the entire band available to a pair of exclusive licensees in both rural and urban areas. Intel et al suggested exclusive licensing of all 50 MHz but only in urban areas among the top 50 Metropolitan Statistical Areas (MSAs), with non-exclusive use in more rural areas. And the Wireless Communications Association International suggested devoting half the band in both rural and urban areas to exclusive use and half to non-exclusive use.

According to Motorola, "Contention-based protocols work best in small areas... In contrast, 3650 MHz operations, pursuant to the Report and Order, would operate over much larger areas and be used by many unaffiliated users in both urban and rural areas. As a result, interference issues will be difficult to identify and remedy. Therefore, implementing the requirement that licensees 'cooperate' and 'resolve; interference 'by mutually satisfactory arrangements' will be more easily said than done, particularly in dense urban areas."

Intel et al stated (at Footnote 22): "In this regard, Petitioners note that Wi-Fi works because approximately a dozen users (i.e., a very limited number of users) are sharing 90 MHz of spectrum. In contrast, the FCC's new rules for the 3650 MHz band would allow dozens, or even hundreds, of users to share a mere 50 MHz. That many users trying to access this limited amount of spectrum would be detrimental to transmission capacity -- causing it to degenerate to something less than broadband or even no transmission at all."

This seems a rather understated appreciation of the value of Wi-Fi.

Intel, itself, has featured lists of the "Most Unwired College Campuses" <http://www.intel.com/personal/products/mobiletechnology/unwiredcolleges.htm>, and "Most Unwired Airports" <http://www.intel.com/personal/products/mobiletechnology/unwiredairports.htm>, as well as "Unwired Hotels".

In each of these environments there is successful operation for dozens, hundreds or even thousands of users via contention based protocols with coordinated deployment of multiple, in some cases very large numbers, of access points.

According to Intel, at the time of its survey the half dozen most unwired campuses were:
1. Indiana University - Bloomington (Bloomington, Ind.)

2. Purdue University (West Lafayette, Ind.)
3. The University of Texas at Austin (Austin, Texas)
4. Case Western Reserve University (Cleveland)
5. Dartmouth College (Hanover, N.H.)
6. Carnegie Mellon University (Pittsburgh)

An article at http://journalism.indiana.edu/gallery/j201spring05/fastforward/ff_wifi.htm states: "The entire Indiana University campus is Wi-Fi-covered from corner to corner, creating a matchless opportunity for student and faculty to gain access. The access even exceeds the campus boundaries, as well, giving some keen Wi-Fi users a taste of total access." There are similarly dramatic reports about activities at others of these sites, e.g.: Caset Western <http://wifinetnews.com/archives/002124.html> and Dartmouth <http://www.networkworld.com/news/2005/022805-dartmouth.html>.

Much of the concerns raised by the Motorola and Intel/Redline/Alvarion petitions dissipate when one recognizes that, in dense urban areas, much of the deployment in the 3650-3700 MHz band can be done in a manner that is carefully designed and managed by local institutions, such as hotels, hospitals, school campuses, office buildings and housing developments, both private and public. Each of these sites has the capacity to implement wireless broadband access in a specific geographic area for a defined set of client devices and is motivated not to broadly transmit potentially interfering coverage too far outside its own location, since antennas that broadcast more widely than necessary also pick up unwanted noise.

While some sites, such as the universities named above, have been leaders in offering Wi-Fi, opening up the 3650-3700 MHz band can make similar deployments simpler and cheaper thanks to higher power limits.

Indeed, the FCC's Report and Order adopted March 10 seems an extraordinarily perspicacious and creative solution that continues to appear to be thoroughly viable even after a careful reading of the nine Petitions for Reconsideration.

At the same time, perhaps it would indeed be useful, as some petitioners suggest, to clarify that there is no intent to totally exclude WiMax, that it can be deployed in the band to the extent that it doesn't cause harmful interference to devices using contention based protocols. And I am sympathetic to the opinion that at 25:1 the ratio of power permitted in base stations and mobile stations may be too high, though I don't claim great expertise in that matter. My impression is that increasing their peak power limit to 100 milliwatts per megahertz might be useful in regard to having client devices successfully transmit back to base stations in both remote rural areas and in urban environments where one is trying to traverse multiple walls plus perhaps a few trees .

Part of the argument of some petitioners was that the highest possible QoS is needed in order for there to be successful competition with wireline providers and that only an exclusive licensing regime could ensure that QoS. It's worth noting that their petitions were submitted prior to the FCC's approval of the Spint Nextel merger, and if the FCC were to reverse course and permit exclusive licenses in the 3650-3700 MHz band that would be a disincentive for Sprint to make the capital investment to quickly deploy WiMax in the 2.5 GHz band where it now has the potential to compete with wireline providers throughout most of the United States. And, as suggested above, I think that deployments in urban areas consistent with the FCC's Order are likely to be, for the most part, considerably more systematically

designed and implemented than several petitioners suggested.

I volunteer assistance to several tenants organizations and CDCs in the Boston area that are working to deploy Wi-Fi access for residents of low- and mixed-income housing developments. In most of these communities, frankly, cost rather than QoS is the barrier that prevents far more widespread adoption of broadband, and there is in many low-income neighborhoods so little pre-existing Wi-Fi use that interference hasn't been a debilitating factor, nor would it likely be one any time soon in the 3650-3700 MHz band either.

An exclusive licensee that were granted rights via auction to 3650-3700 Mhz spectrum via auction would likely be slow to deploy in these low-income neighborhoods, because demand for fairly expensive service is relatively weak and because less experienced computer/Internet users may require extra technical support. On the other hand, public and nonprofit entities and locally-based WISPs can make serving these same areas a priority if the FCC retains its innovative plan for non-exclusive licensing, which will permit many routes to deployment by a diverse set of service providers.

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